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This report summarizes the final results of the purchase, acquisition and installation of a JEOL Model GSX Superconducting Multinuclear Spectrometer.

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Final Report
for the period
November 1, 1986 to August 1, 1988

AFOSR Grant No. 87-0036

Purchase of a Nuclear Magnetic Resonance Spectrometer

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This report summarizes the final results of the purchase, acquisition and installation of a JEOL Model GSX400 Superconducting Multinuclear Spectrometer.

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Funds from the Department of Defense through Grant No. AFOSR-87-0036 were used in combination with matching funds from NDSU to purchase the Model GSX400 Nuclear Magnetic Resonance Spectrometer whose specifications are given below:

GSX-400/54 HIGH RESOLUTION FOURIER TRANSFORMATION

NUCLEAR MAGNETIC RESONANCE SPECTROMETER SYSTEM

Basic System Includes:

MAGNETIC SYSTEM & PROBES

- Superconducting Solenoid and Dewar (Oxford Instruments) Operating at 9.4T Providing Proton Observation at 400MHz and Carbon at 100MHz; Room Temperature Bore Diameter of 54mm; Room Temperature Matrix Shim System and Power Supply.
- Cryogenic Monitoring System for Liquid Helium and Nitrogen.
- SCM and Probe Terminus Console (M-CON).
- Liquid Helium Transfer Tube.
- Carbon/Proton Dual 5mm Variable Temperature Probe.

SPECTROMETER CONSOLE (S-CON)

- Total Micro-Processor Control of S-Con Hardware and Functions.
- Status Integrity Check (SIC) Diagnostics Including 8 bit Registers for All Circuit Boards.
- Fiber Optics Link to PLEXUS Data System.
- Carbon and Proton r.f. Oscillators, Offset Units and Pre-Amplifiers
- Wide-Band Power Amplifier.
- Deuterium Internal Auto Lock System with Lock Monitor.
- Proton Homo/Hetero Multi-Mode Gated Decoupler.
- SHIMPLEX Control of All Room Temperature Gradients (Spinning and Non-Spinning).

- Programmable Variable Temperature Unit, Model C-VT-3 (-150C to +180C).
- Phase Lock of Phase Shifters, Lock Irradiation and Observation Channels.
- Comprehensive Multi-Pulse Programmer (PGX-300).

OPERATION CONSOLE (OP-CON)

- Complete Spectrometer Control of All Functions through Plexus Data System.
- DEC 11/73 System Control Processor, with 2 Mbyte (16 bit) LSI Memory, on a 22 bit Q-bus.
- DEC RSX 11M Operating System.*
- JEC-32 NMR Acquisition Processor with 2.56 MW 32 bit Word Memory Expandable to 5.12MW.
- 71 Mbyte Winchester Disc with 95 Mbyte 1/4" Streamer Back-up.
- Dual 400Kbyte 5.25" table top floppy disk drive.
- 12 bit, 100 KHz ADC (2 Channel).
- 8 Pen, 8 Color (HP 7550A) Digital Plotter.
- 80 Column, 150 CPS Alphanumeric Printer.
- 14" Color Graphics Display Terminal (Tektronix 4208) with Alphanumeric Keyboard, Keypad, and mouse.
- Comprehensive FT-NMR Acquisition/Processing Software (PLEX).
- Starter Kit. 1 Roll of Digital Plotter Paper, 5 NMR Tubes, 5 Vortex Plugs, 3 Standard Samples (5mm) and 3 Pens.

*RSX is a D.E.C. Registered Trademark

Broadband system, includes frequency synthesizer and controller, multi-oscillator, head amp, and cables.

5 mm tunable V.T. Probe (^{31}P - ^{15}N)

This instrument is now fully installed and operational. All specifications have been met or exceeded and the instrument is now fully implemented into the research program supported by the Air Force through Grant No. AFOSR-88-0060 as well as other research projects in the Department of Chemistry.

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